Manuscript title: Exploring the mediation effect of awareness and quarantine in affecting rate:

A study on COVID-19

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Abstract:

COVID-19 is a very smash and apprehensive health issue in the current world which broke the medical system of whole earth originated in the wholesale sea market of Wuhan city, Hubei province, China on December 12, 2019. One key technique as lockdown has been followed by almost every country to protect the transmission of the virus. Comprehensive research is needed to explore the techniques for preventing the virus besides the innovation of vaccines and medicine. This study explores the awareness and quarantine strategy whether the technique is effective or not to monitor the affecting rate of COVID-19. In addition to explore the awareness and quarantine, the effectiveness of knowledge regarding the symptoms of SARS CoV-2 to reducing the affecting rate is also examined. A total of 264 samples were used by a self-administered questionnaire. The findings of the study indicate that cough, fever, diarrhea and weakness are the common symptoms of the disease which knowledge on them significantly influences to control the affecting rate of COVID-19. The study also indicates that awareness

and quarantine mediate the significant positive relationship between the symptoms of the disease and its affecting rate. The results of the study could contribute as a guideline for the patient, community, decision-maker of a particular country to monitoring the affecting rate and for a researcher as an opportunity for further study.

Keyword: symptoms, awareness, quarantine and COVID-19.

1. Introduction

Novel coronavirus or COVID-19 is the most pressing and worrying issue in the present arena of the world which first originated in the wholesale sea market of Wuhan city, Hubei province, China on December 12, 2019[1] and now spreading over 200 countries in the world and World Health Organization (WHO) declared this virus as a global pandemic outbreak on January 30, 2020[2]. Coronavirus first emerged in the mid-1960s and there are seven different versions of the virus (229E, NL63, OC43, HKU1, MERS-CoV, SARS-CoV, and the SARS CoV-2 or COVID-19) broken into four groups: alpha, beta, gamma, and delta[3] where the last member of the corona family, COVID-19 shaped more danger and contaminate to the human body rapidly and other species of bat[1], cat, and tiger which infected 1,098,456 persons, ultimately death 59,162 persons and recovered 228,923 persons worldwide by April 3, 2020[4].

The common symptoms of the COVID-19 patients were fever, cough, fatigue, muscle pain, diarrhea, sputum production, headache, hemoptysis, myalgia, dyspnea, dizziness, abdominal pain, nausea, vomiting, and pneumonia which can produce to massive respiratory distress syndrome, metabolic acidosis, infected tremor, thickening dysfunction, and organ

failures such as liver, kidney, and heart failure or even death[2,5-8]. These symptoms of this virus are varied patient to patient[7, 9] which need to address properly to detect the case and isolate the patient from others which are the main ways to control the affecting rate[5]. On the other hand, raising awareness to the people to be safe from the contamination of the virus would effect to control the affecting rate of this disease[10,11]. Moreover, isolation through quarantine or separate the affected patient from the sound people or even lockdown the sound people would have significant effects on reducing the affecting rate of COVID-19[11]. As a result, a study on COVID-19 to explore its symptoms and analyzing the effectiveness of awareness and quarantine to control the affecting rate is of utmost importance[12].

Moreover, the scientists, doctors, and other experts are working for inventing the medical structure of the virus such as [3, 7-9, 13, 14]. On the other hand, some researchers worked on the social effects of this virus[11, 15, 16]. However, almost every government of the affecting country followed the lockdown strategy to keep safe of their citizen from attacking the virus (COVID-19) and the isolation or quarantine policy also applied to reluctant the public and they are also receiving a better result from this approach (i.e. China, South Korea, Singapore, and Taiwan), there is a shortage of study about the symptoms of the disease, awareness, and quarantine can reduce the affecting rate of COVID-19. As a result, this study has been attempted to explore the symptoms and the effectiveness of awareness and quarantine to reduce the affecting rate of the virus (COVID-19). In this study, the five common symptoms of SARS CoV-2 such as; cough, fever, headache and neck pain, diarrhea, and weakness were explored. Furthermore, the mediating role of awareness and quarantine on reducing the affecting rate of COVID-19 also examined.

In line with the research objective, this study used qualitative and quantitative methods. In the qualitative method, we used content analysis of the relevant literature to explore the

symptoms of the disease. On the other hand, in the quantitative approach, three specific steps were followed. Firstly, the five considered symptoms of COVID-19 were explored through the interview of the patients, doctors, and experienced people who had interaction or communication with any relatives or friends of the patients of the disease by the set of questionnaires which placed by the Google form in the online platform. After scrutinizing the symptoms directly collected from the respondents, it examined the common and unique indications described by the experts or doctors in prior literature. Secondly, how does the awareness effect to subsiding the affecting rate and what issues should be aware of the people also explored in this study? Thirdly, the concept and the actual system of quarantine also explained. Moreover, the nexus between the quarantine technique and the affecting rate of COVID-19 also assessed as well. Finally, the mediating role of awareness and quarantine technique on reducing the affecting rate of this virus was calculated. This study makes numerous significant theoretical and practical contributions to the existing literature. It could contribute significantly to the scholars who are working on this burning issue as well as to the decision-makers of each country in the world who almost tried to tackle the situation affected by the COVID-19.

In addition to the benefits of the scholars, this study also contributes significantly to the people including doctors, nurse, community and ultimately to the patients of this disease by understanding the symptoms so that it is possible to prior preparation for surviving with the virus and take precaution for keeping safe to others. Moreover, the decision-makers of the country would find the techniques to aware their people; they would also realize the effectiveness of the quarantine technique to isolate the affected people from the safe people. Finally, this study could be the solid arms to fight against the COVID-19, hence, it would influence to control the

affecting rate or ultimately death rate by this virus through concerning the people and implementing the quarantine technique.

2. Literature reviews

The new virus COVID-19 is a very contagious and spread quickly worldwide which exposed some common symptoms to the affected patient[17]. In medical science, some dictionaries[18] defined the symptom of a disease as a physical or mental feature, or any subjective evidence of a disease, which is regarded as indicating a condition of disease, a departure from normal function or feeling particularly such as feature that is apparent to the patient. The researchers conducted studies on COVID-19 have marked some symptoms of the patient[12] identified fever, fatigue, dry cough, myalgia, dyspnea, headache, dizziness, abdominal pain, diarrhea, nausea, and vomiting were the common symptoms of COVID-19 at illness. [5]recognized fever, cough, fatigue, muscle pain, diarrhea, and pneumonia, which can develop to acute respiratory distress syndrome, metabolic acidosis, septic shock, coagulation dysfunction, and organ failure such as liver, kidney, and heart failure, were the clinical manifestation of COVID-19. [19]conducted an experiment on 68 COVID-19 patients admitted to the First Affiliated Hospital (Hefei) and Fuyang Hospital (Fuyang), both of which are part of Anhui Medical University in China revealed that most of the patients had fever (80.88%), cough (73.53%), and sputum (32.36%) upon admission. The pervasiveness of other symptoms (e.g., headache, diarrhea) was relatively low. [7]also conducted a deep experiment on one patient aged 41 years who was a worker at the Wuhan market of China where the COVID-19 originated and admitted to the Central Hospital of Wuhan on 26 December 2019 while experiencing a severe respiratory syndrome that included fever, dizziness and a cough and he also reported that he has been suffering fever, chest tightness, unproductive cough, pain and weakness for 1 week.

Accordingly, coughing, shortage of breathing, fever, weakness, diarrhea and headache are identified as the basic symptoms of COVID-19, and hypotheses H_1 (*a, b, c, d, e*) are proposed. The symptoms of the disease detected by the different scholars are cough[2,7,8,11-13,19], fever[2,5,7,8,11,12,19], headache[2, 5, 8, 11, 12, 19], diarrhea[2, 5, 8, 9, 11, 12], and weakness[3, 5, 7, 8, 11, 20].

Mediating role of awareness

Awareness associated with knowledge about the nature of virus (contamination, infectious, spreading voltage, spreading wings, life-threatening, symptoms, etc.), protection criteria (wearing a mask, washing hand for at least 20 seconds frequently, use of antiseptics, avoid touching the face, avoid close contact minimum 3 meters, social distance, cleaning dwelling place with office and other spots, safety issues for going out unless emergency, etc.) improvement of the immunity system (food nutrition, vitamin, exercise, etc.), treatment (no specific medicine and vaccine) and patient management system (call on a doctor, test the result whether positive or negative, wearing personal protection equipment, isolation and quarantine technique, etc.). Awareness of the stated issues above regarding the COVID-19 could significantly influence on controlling the affecting rate of the patient and to enable the outbreak management of this virus in a particular region, there is a crucial prerequisite to comprehend the public awareness of COVID-19 at this critical moment[12, 21, 22]. The outbreaks of current COVID-19 pandemic could be prevented and controlled by the awareness and sensitization approaches (Water, Sanitation and Hygiene (WASH) measures) as a significant element of a resilient healthcare system[23]. Moreover, in addition to the above scholars[24-26] etc. also stated that sufficient knowledge about the divergent issues of COVID-19 is very essential among each and every member of the community for preventing the attack of Novel coronavirus. Accordingly, it

is hypothesized that awareness mediates the relationship to reduce the affecting rate of COVID-19 and H_2 is proposed.

Mediating role of Quarantine

In general, quarantine is a strict isolation imposed to prevent the spread of disease. It separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick. These people may have been exposed to a disease and do not know it, or they may have the disease but do not show symptoms. According to the Centers for Disease Control and Prevention (**CDC**), quarantine is the separation of a person or group of people reasonable believed to have been exposed to a communicable disease but not yet symptomatic from others who have not been so exposed to prevent the possible spread of the communicable disease. The quarantine restricts the social distance and close contact from others who suspected or not suspected to have the symptoms of COVID-19 minimized the human interaction in urban and rural setting followed by several countries and resigns in the world brought the effective result to control the affecting rate[16]. A study titled impacts of social and economic factors on the transmission of Coronavirus Disease 2019 (COVID-19) in China revealed that quarantine, massive lockdown and other public health measures significantly reduced the transmission of COVID-19[11]. Therefore, it is hypothesized that quarantine mediate the relationship to reduce affecting rate of COVID-19, and H_3 is proposed.

Conceptual Research Model: From review of the above relevant pieces of literature, the following conceptual research model is proposed for the study.
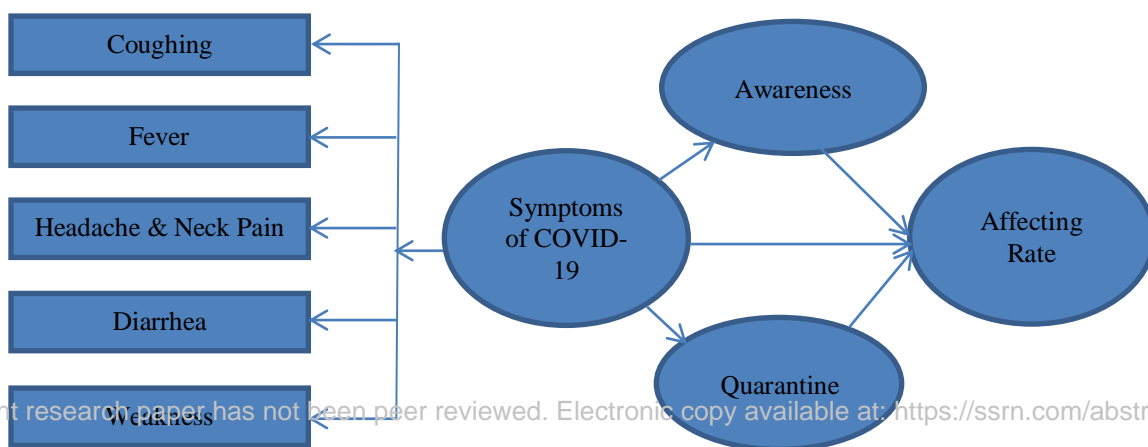
Figure 1: **Conceptual Research Model**

The model illustrated that the symptoms of COVID-19 include coughing, fever, headache and neck pain, diarrhea and weakness are influencing to the affecting rate. The knowledge of symptoms may positively influence to reduce the affecting rate which needs to address properly. Besides, the awareness regarding diverse issues of the virus and the quarantine technique (separation between patient and unaffected people) also may positively influence to reduce the affecting rate to be examined in this paper.

3. Research design

The proposed model is examined using survey data collected in online. A self-administered questionnaire with a seven-point Likert scale is used, which is ranging from strongly disagree (1) to strongly agree (7). Random sampling is used as a data collection technique. The survey is conducted from April 1 to April 15, 2020, in Bangladesh. Since, Bangladesh is one of the most densely populated country and very vulnerable for COVID-19 due to its socio-economic condition. Initially, a total of 286 samples were collected but after data cleaning and removal of missing data, 264 are kept for final consideration.

The measurement items are self-developed due to the not availability of cross-sectional study in existing pieces of literature (shown in Table 1). Initially, we developed the measurement items based on our understandings of the context. Then, we discussed with several doctors, researchers and other health professionals as well. We pre-tested the questionnaire in order to check wordings, structure, readability, and meaningfulness. Having the pre-tested results, we

again consult with the expert mentioned above, and then the questionnaire is operationalized for

data collection.

Measures	Code	Mean	Std. Deviation	Chronbach's alpha
Cough				
I have heard or had experience that Corona patience is persistently coughing	C1	5.03	1.772	0.60
I have heard or had experience that Corona patience is sometime coughing	C2	4.72	1.830	
I have heard or had experience that coughing for usual disease is same as the attack of Corona virus	C4	4.02	2.093	
I have heard or had experience that coughing is the one of the common symptoms of Corona virus	C5	5.42	1.869	
Fever				
I have heard or had experience that Corona patience has high body temperature	F1	5.46	1.720	0.66
I have heard or had experience that Corona patience has normal body temperature	F2	2.92	1.791	
I have heard or had experience that Corona patience has slight higher body temperature	F3	4.48	1.763	
I have heard or had experience that fever for usual disease is same as the attack of Corona virus	F4	4.21	2.098	
I have heard or had experience that fever is the one of the common symptoms of Corona virus	F5	5.77	1.580	
Pain in neck and head				
I have heard or had experience that Corona patience has hard pain in neck and head both	P1	4.48	1.944	0.77
I have heard or had experience that Corona patience has hard pain only in neck	P2	3.53	1.841	
I have heard or had experience that Corona patience has hard pain only in head	P3	3.31	1.746	
I have heard or had experience that Corona patience has normal pain in neck and head both	P4	3.53	1.750	
I have heard or had experience that Corona patience has normal pain only in neck	P5	3.21	1.772	
I have heard or had experience that Corona patience has normal pain only in head	P6	3.11	1.712	
Diarrhea				
I have heard or had experience that Corona patience is persistently diarrhea	D1	3.47	1.990	0.87
I have heard or had experience that Corona patience is sometime diarrhea	D2	4.08	1.928	
I have heard or had experience that diarrhea is the one of the common symptoms of Corona virus	D4	3.77	2.078	
Normally, diarrhea is seen at the second stage of attack of the Corona virus	D5	4.19	2.044	
Weakness				
I have heard or had experience that Corona patience feels very weakness	W1	5.16	1.753	0.78

Table 1: Measurement items

I have heard or had experience that Corona patience feels sometime weakness	W2	4.83	1.721	
I have heard or had experience that weakness is the one of the common symptoms of Corona virus	W4	4.53	1.920	
I have heard or had experience that Corona attack patience is more depressed than other disease	W5	5.18	1.917	

Awareness

Awareness about the danger and ways of spreading in human body could reduce the affecting rate of this virus	A1	5.93	1.647	0.88
Awareness about the food habit could enrich the immune system of human body for fighting with this virus	A2	5.60	1.752	
Awareness about the liking environment of this virus could reduce the affecting rate in the human body	A3	5.25	1.698	
Awareness about the risky ages for this virus could help to protect from affecting this virus	A4	5.17	1.905	
Awareness about the treatment and no vaccine of this virus could help to be more concern and reduce the affecting rate of this virus.	A5	5.12	1.997	

Quarantine

Quarantine for 14 days could help to control the spreading of Corona virus	Q1	5.90	1.552	0.89
Quarantine is one of the best ways to control the spreading of Corona virus	Q2	5.86	1.628	
Totally lockdown is better than the quarantine for controlling the Corona virus	Q3	5.40	1.851	
Quarantine rules should learn to the people to be more effective for protecting from Corona virus	Q4	5.85	1.513	
People had no experience about the life in quarantine	Q5	5.23	1.785	

Affecting rate

The affecting rate of Corona virus made worried to the people	AR1	5.87	1.545	0.88
Although death rate is lower than the cure rate, scientist should hurry-up to innovate the vaccine	AR2	5.63	1.791	
Cure rate is lower than the affecting rate of the Corona virus	AR3	5.01	2.080	
Affecting rate and death rate by Corona virus both are increasing rapidly worldwide	AR4	5.85	1.636	
Death rate by the Corona virus for the senior citizen is higher than the infant and younger groups	AR5	5.74	1.687	
Affecting rate is increasing to the low temperature countries	AR6	5.11	1.835	

Source: survey results.

Among 264 participants, 77.7% are female and 22.3% are male. 67.8% of the participants are students followed by job holder 26.1% and unemployed 3.4%. Overall, the maximum numbers of the respondents are undergraduate and obtained a higher degree by research 49.6% and 42.4%, respectively. The leading age group of the participants is 20-24 as 55.3% and most of

them earn around $500 in a month. A detailed review of the respondents' demographic profile is

shown in Table 2.

Table 2: Demographic characteristics

Characteristics (N = 264)	Frequency	Percentage
Gender		
Female	205	77.7
Male	59	22.3
Profession		
Student	179	67.8
Job holder	69	26.1
Unemployed	9	3.4
Business	6	2.3
Home maker	1	0.4
Educational qualification		
Below undergraduate	13	4.9
Undergraduate	131	49.6
Higher degree by research	112	42.4
PhD	8	3
Age group		
20-24	146	55.3
25-29	71	26.9
30-34	20	7.6
35-39	22	8.3
40-44	5	1.9
Monthly income		
Below $500	164	62.1
$500-$1000	35	13.3
$1000-$1500	9	3.4
$1500-$2000	3	1.1
$2000-$2500	9	3.4
More	2	0.8

Source: survey results.

4. Empirical results

In regards to the reliability and validity of the data, this study assesses construct-wise reliability.

Chronbach's alpha value of each construct is higher than its critical value of 0.60, representing

good internal consistency of data (shown in Table 1). Kaiser-Meyer-Olkin measure of sampling

adequacy is 0.931 with a significant p-value. In addition, the model explained 38% of the

variance by first factor and several factors have Eigenvalues greater than one, which representing there is no model biasness issue in this study.

Having adequate data and model relativity, we conduct regression analysis in SPSS in order to examine the hypothesized relationships among variables. Table 3 shows the effect size of individual causes of COVID-19 to affecting rate. The results of the study reveal that among five causes four are highly representative to COVID-19 affecting rate.

Table 3: Individual symptom effect

Hypothesized paths			Estimate	t	p	Decision
Cough	--->	affecting rate	0.16	2.65	***	accept
Fever	--->	affecting rate	0.32	5.01	***	accept
Pain	--->	affecting rate	-0.01	-0.37	n.s.	reject
Diarrhea	--->	affecting rate	0.10	2.16	**	accept
Weakness	--->	affecting rate	0.32	5.68	***	accept
Variance explained in affecting rate of 0.56.						

Note: *** $p < 0.001$, ** $p < 0.05$, n.s. not significant.

According to[27] model, we measured the mediation effect of awareness and quarantine in affecting rate by aggregating the individual symptoms. Table 4 shows the different models effect on affecting rate, which are significant with their coefficient value. Model 1 shows the maximum direct effect of aggregate symptom to affecting rate. Once awareness is entered into the model (model 3), the coefficient value has become lower, similar results are found for the quarantine mediation variable in model 5. Overall, in the full model (model 6), the effect size of aggregate symptom to affecting rate becomes less than its half-effect compared to the direct model. In addition, the Sobel test results reveal that there is a mediation effect of awareness ($t = 7.75$, $p < 0.001$) and quarantine ($t = 8.32$, $p < 0.001$) in the relationship between aggregate symptom and affecting rate.

Table 4: Mediation analysis

Variables	Direct effect model	Awareness mediator model		Quarantine mediator model		Full model
	model 1 β (t-value)	model 2	model 3	model 4	model 5	model 6
Aggregate symptom _ affecting rate	0.72 (16.93)***					
Aggregate symptom _ awareness		0.66 (14.27)***				
Aggregate symptom _ affecting rate			0.41 (8.48)***			
Awareness _ affecting rate			0.45 (9.28)***			
Aggregate symptom _ quarantine				0.67 (14.89)***		
Aggregate symptom _ affecting rate					0.38 (7.87)**	
Quarantine _ affecting rate					0.49 (9.960)**	
Aggregate symptom _ affecting rate						0.30 (6.09)***
Awareness _ affecting rate						0.28 (5.24)***
Quarantine _ affecting rate						0.34 (6.18)***
Variance explained	0.52	0.43	0.64	0.45	0.65	0.68
Sobel test results:						

via awareness: t-statistics = 7.75, std. error = 0.052, $p < 0.001$.

via quarantine: t-statistics = 8.32, std. error = 0.053, $p < 0.001$.

Note: *** $p < 0.001$, ** $p < 0.05$.

5. Discussion and Conclusion

COVID-19 is the most dangerous virus in the Corona group which is significantly influencing to the world economy almost stabling daily life, since people restricted to go out. To subsidize the affecting rate of the virus through the know-how of the symptoms, this study

attempts to establish the common symptoms of the disease in addition to the light of mediating effect of awareness and quarantine on the affecting rate. The results of individual symptom effect (Table 3) shows that the hypothesized paths of cough, fever, diarrhea, and weakness are significantly influencing to the affecting rate of the virus, since the entire hypotheses associated with the symptoms are accepted without the symptom of pain. As a result, cough, fever, diarrhea and weakness are established as the main antecedents of the symptoms of the disease affected by COVID-19. Therefore, the accurate knowledge of the symptoms of the patient provides a chance to be more aware of the disease through which the patient could isolate and prevent others which ultimately effect on controlling the affecting rate.

In addition, the result of mediation analysis (Table 4) reveals that awareness and quarantine are significantly mediating the relationship between the symptoms of the disease and affecting rate of COVID-19. Table 4 shows that in the direct effect model, the coefficient value of symptoms is 0.72 (Model 1) whereas when the mediating variable awareness is added, the coefficient value reduces to 0.41 (Model 3), moreover, again when the mediating variable quarantine is added, the coefficient value reduces to 0.38 (Model 5) and a combination of two mediating variables (awareness and quarantine) diminish the coefficient value to 0.30 (Model 6). Furthermore, the result of the Sobel test also supports that awareness and quarantine mediate the relationship between the symptoms of the disease and its affecting rate. Therefore, it can clearly state that if the people are getting more awareness about the COVID-19 (causes, treatment, prevention, etc.) and follow the quarantine approach strictly in addition to the knowledge of symptoms, it would possible to control the affecting rate of the disease.

In the side of the contribution, this study has four specific areas; patient, community, decision-maker of the country and the researcher. Firstly, this study could significantly

contribute to the patient to be familiar with the symptoms so that he/she would get a chance for taking some preventive measures as well as isolating him or her from others to protect the family and community as well. Secondly, the community would learn from the study that awareness and quarantine could positively influence to resist the affecting rate of a disease where they would be more vigilant to reduce the community transmit of the virus. In addition to the gen of awareness and quarantine, the community also would be capable to diagnose the symptoms of the disease which could inspire to be confirmed through the test positive or negative would be supportive to run the quarantine strategy. Thirdly, the decision-makers of the particular region would get the guidelines from the study that how the familiarity of symptoms of the disease could aware the societies and the significance of quarantine and awareness to control the affecting rate of the virus. As a result, the announcement of symptoms and key issues of awareness regarding virus through a variety of Medias could concern the people and monitor the community transmits; besides, the effectiveness of the quarantine also could be measured from the study. Finally, the scholars would find further issues to conduct research where this paper could contribute significantly.

The current study has two specific limitations; firstly, the items and constructs used in the study were self-developed by the researchers due to the shortage of works of literature. As of the new issues, most of the studies have been conducted on the medical structure of the virus whereas it has a scarcity of papers on the behavioral science. As a result, we could not follow any constructs and items from the existing pieces of literature to design a questionnaire for this study. Secondly, data of the study have been collected from the respondents only who had an experience with the virus (COVID-19) from others who were not an actual patient of the disease. The researchers would have the scope to conduct further study on gaps mentioned.

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